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RHODODENDRON LEAVES AS THERMOMETERS.

By JOHN F. JOHNSON.

[From Country Life in America, November, 1904, vol. 7, No. 1, p. 72.]

Rhododendron leaves constitute a fairly reliable natural thermometer. The photographs were all taken from the same plant at different temperatures. The first picture, taken with the thermometer at 45° F., shows the normal or flat condition during mild weather. Waiting until the thermometer registered 17° F., I photographed the same branch, and found the leaves in the position illustrated in fig. 2[1], a drooping of the leafstalks and an inward curling of the blades having taken place.

After noting this change in conditions, I was interested to find out what effect a sudden rise in temperature would have upon the leaves, so I took this branch away and placed it in a temperature of 45° F. Immediately, with a springing motion, the leaves started to expand, the leafstalks to straighten themselves, and in eight minutes both leaves and leafstalks had reverted to their normal condition. Thus, it will be observed that the transition in the conditions of the leaves from fig. 2 to fig. 1 occupied a space of time not much exceeding that which mercury would take to cover the same number of degrees, under similar conditions. Having noted the effect of a rise in temperature, I set the same branch outside again in 17° F. This time the leaves took twenty minutes—nearly three times as long—before they reached the condition of fig. 2.

Fig. 3 illustrates the effect of zero weather on another branch from the same bush. Here the leaves I found to be much more tightly rolled up, the edges in most cases curling inward to touch the midrib on the under side. The difference between fig. 2 and fig. 3, or 17° F., will be observed to be fairly proportionate to that between fig. 1 and fig. 2.

Nature has a purpose for all these metamorphoses. Less transpiration and consequently less loss of heat is the result of this curling. This power in living plants of conforming to external circumstances is called irritability. Somewhat analogous to the above is the closing up and sleeping of clover leaves at night. Tulip flowers also exhibit this power of closing and expanding under different temperatures. When placed in a heated room, during sunshine, or mild weather outdoors, the petals expand, but will contract and close together when subjected to reduced temperature.

FAKE RAINMAKING—A LETTER FROM THE CHIEF OF BUREAU.

U. S. DEPARTMENT OF AGRICULTURE, WEATHER BUREAU,
Washington, D. C., April 5, 1905.

EDITOR THE TOLEDO BLADE,
Toledo, Ohio.

DEAR SIR: In reference to a dispatch from Riverside, Cal., which appeared in your issue of March 29, and which stated that heavy rains had occurred in southern California during the past winter as the result of a single rainmaking station established on the slope of Mount Wilson, permit me to say that the liberation of chemicals on Mount Wilson had nothing to do with the rainfall in southern California. Your dispatch stated that the heaviest rain fell in the region of the rainmaker, and that the rainfall had not been large in any of the other regions of the subarid West. This statement is erroneous, as during the same period general and excessive rains occurred throughout Arizona and New Mexico. The cause of heavy rains was not local, but was associated with general abnormal atmospheric conditions over the United States that were in turn associated with abnormal conditions that obtained over a large part of the Northern Hemisphere.

It is known that when barometric pressures for a month are low in the Southwest[2] the period is one of frequent and heavy rains in that region, and this barometric condition pre-

[1] The photographs are omitted as not essential to the main idea of the paper.

[2] That is, the southwest, the north, and the east portions of the United States.—ED.

vailed over New Mexico, Arizona, and southern California during the three-month period under consideration. The association between low barometric pressure and excessive rains in the Southwest[2] and high barometric pressure and unusual cold in the North[2] and East[2] has also been established. It has been observed, in fact, that during winters of excessive cold in the northern and eastern districts of the United States the seasons have been unusually wet from western Texas to southern California.

During the past winter the associated conditions referred to have prevailed, and they have resulted in frequent and generally excessive rains not alone in southern California but in all of the immense territory that extends thence eastward to Texas.

It is, therefore, apparent that the rainfall which was supposed to have been caused by the liberation of a few chemicals of infinitesimal power was simply the result of general atmospheric conditions that prevailed over a large area. It is hoped that the people of southern California will not be misled in this matter and give undue importance to experiments that doubtless have no value. The processes which operate to produce rain over large areas are of such magnitude that the effects upon them of the puny efforts of man are inappreciable.

Very truly yours,

(Signed) WILLIS L. MOORE,
Chief U. S. Weather Bureau.

WIND VELOCITIES FOR DIFFERENT ALTITUDES AND EXPOSURES.

By ALEXANDER J. MITCHELL, Section Director, Jacksonville, Fla.

On August 1, 1902, the Weather Bureau office in Jacksonville was removed from the Astor Building to the Dyal-Upchurch Building. As a result, there was a change in the elevation of the anemometer cups amounting to 45 feet.

The mean hourly wind movement for the several months shows that the increase in elevation of nearly half a hundred feet results in an increase of wind velocity averaging about two miles per hour based on data for the two years ending July, 1904, as compared with the previous two years, 1900–1901 and 1902, before the removal of the office from the Astor Building. See Tables 1 and 2. Of course, these data have no conclusive value, being for only a limited time.

It is believed, however, that data for five years will show as great, or greater, hourly value as that now indicated. Certainly more verifying velocities have occurred and less pronounced pressure gradients give higher wind velocities than was the case at the old location.

In connection with wind velocity varying with the elevation of the anemometer cups as a result of better circulation and more freedom from obstructions, the average hourly velocities for the lustrum 1875-1879, with an elevation of 23 feet, the office being at the National Hall Building, and the lustrum 1897-1901, elevation 84 feet, when the office was at the Astor Building, are shown in Tables 3 and 4. In this case, with a difference in elevation of the anemometer cups amounting to 61 feet, the average difference per hour was only one mile.

Assuming that data for the lustrums used are reasonably correct and that during the period considered average weather conditions prevailed, it would appear that an increase in elevation of anemometer cups of 50 to 60 feet results in an increase of approximately one mile per hour in the lower circulation at this station.

[2] That is, the southwest, the north, and the east portions of the United States.—ED.

TABLE 1.—*Astor Building. Average hourly velocity, years 1901-2. Elevation of anemometer cups, 84 feet above the ground.*

Years.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1900	...	...	...	...	...	...	...	6	7	7	6	7
1901	8	7	9	10	9	7	7	7	9	8	7	8
1902	7	9	9	7	7	8	7	...	...	...	...	...

TABLE 2.—*Dyal-Upchurch Building. Average hourly velocity, years 1902-3. Elevation of anemometer cups, 129 feet above the ground.*

Years.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1902	...	...	...	...	...	...	...	9	9	10	9	9
1903	10	12	10	11	10	9	8	8	11	9	10	9
1904	11	10	10	11	9	10	9	...	...	...	...	...

TABLE 3.—*Average hourly velocity for the lustrum 1875 to 1879. Elevation of anemometer cups, 23 feet. National Hall Building.*

Years.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1875	6	7	8	8	8	6	7	6	7	6	7	6
1876	6	7	8	6	6	8	7	6	7	7	6	6
1877	5	7	8	8	8	7	7	6	6	8	7	7
1878	7	8	7	7	6	6	6	5	8	6	6	6
1879	6	7	6	8	7	6	6	6	7	8	6	6
Average	6	7	7	7	7	7	7	6	7	7	6	6

TABLE 4.—*Average hourly velocity for the lustrum 1897 to 1901. Elevation of anemometer cups, 84 feet. Astor Building.*

Years.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
1897	7	8	9	8	7	7	7	6	8	7	7	6
1898	7	7	8	8	7	7	7	8	8	8	8	8
1899	8	9	8	9	7	7	7	7	9	9	6	8
1900	7	7	8	8	7	7	7	6	7	7	6	7
1901	8	8	9	10	7	7	7	7	9	8	7	8
Average	7	8	8	9	7	7	7	7	8	8	7	7

TORNADOES OF MARCH 17, 1905, IN WESTERN OKLAHOMA.

By C. M. STRONG, Observer, Oklahoma, Okla.

The morning weather map of March 17, 1905, showed a storm of considerable energy, central over Utah, which was causing cloudy weather, showers, southerly winds, and higher temperature over the western Plateau region and the central western valleys.

This storm moved slowly eastward and was central over Colorado by the morning of the 18th.

During the afternoon of the 17th tornadoes and hailstorms developed over western Oklahoma, causing destructive effects over Roger Mills, Kingfisher, and Garfield counties. The storms were noted over Roger Mills County about 4 p. m., and over Kingfisher and Garfield counties about 5 to 6 p. m., ninetieth meridian time.

Sixteen persons were injured and two dwellings destroyed at Poarch, Roger Mills County, and three persons and one dwelling at Garber, Garfield County.

Following are the reports received concerning the several tornadoes:

Poarch, U. N. Waldrup, Postmaster.—Funnel-shaped cloud formed 4 p. m., central time, moved northeast with slight whirling motion from right to left, accompanied by heavy rain, hail, and lightning; length of path, five miles, width, one-half mile; sixteen persons injured, two dwellings destroyed.